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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/449,215	11/24/1999	YASEEN SAMARA	15-IS-5290	6012

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EXAMINER	
KIM, CHONG R	
ART UNIT	**PAPER NUMBER**
2623	14

DATE MAILED: 11/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/449,215	SAMARA ET AL.
	Examiner	Art Unit
	Charles Kim	2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 03 September 2003 .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-3,6,7,11-14,17-23 and 26-32 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-3,6,7,11-14,17-23 and 26-32 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 24 November 1999 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment and Arguments

1. Applicant's amendment filed on September 3, 2003 has been entered and made of record.

2. Applicant's arguments have been fully considered, but they are not deemed to be persuasive for at least the following reasons.

Applicants argue (page 10) that their claimed invention (claims 1, 14, and 23) differs from the prior art because "Alvarez does not disclose the use of PACS workstations for creating 3-D image renderings". The Examiner responds by pointing out that Alvarez is not relied upon to teach this feature. This feature is taught by the combination of Wood and Alvarez, as noted in the previous office actions. Furthermore, the Examiner notes that this argument has already been addressed on page 2 of a previous office action dated February 11, 2003 (paper number 7).

Applicants further argue (page 10) that "nowhere does Alvarez discuss the use of a PACS server". The Examiner disagrees. As noted in the previous office action (page 6), Alvarez's system (10) is interpreted as being analogous to a PACS server because his system "interacts" with a PACS system by sending 2D images to a PACS workstation, in order for a physician to view the image on a workstation.

Applicants further argue (page 10) that "no where does Alvarez disclose, teach, or suggest that the PACS workstation can be used to render the 3-d image from a collection of 2-D image slices and then communicate the 3-D image render to a PACS server". The Examiner responds by pointing out that this argument has been addressed on page 3 of the previous office action.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 6-7, 11-14, 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Wood (U.S. Patent No. 5,715,823), and Alvarez (U.S. Patent No. 6,370,413), further in view of Hossack et al., U.S. Patent No. 6,511,426 ("Hossack").

Referring to claim 1, Wood discloses:

a. an image server (10) having a plurality of inputs and outputs (figure 1), the inputs configured to receive image information signals and the outputs configured to provide image output signals, the image server configured to store information representative of a plurality of two dimensional image slices and the output signals representative of the stored two dimensional image slices (col. 3, lines 3-29)

b. an imaging device (12) having an output coupled to at least one of the inputs of the image server, and configured to provide an image signal (col. 2, line 62-col. 3, line 6)

c. an image workstation (100) having an input coupled to at least one of the outputs of the image server (figure 1), and configured to receive output signals from the image server representative of selected two dimensional image slices stored by the image server (col. 3, lines 20-24), the image workstation configured to construct three dimensional image renderings from the two dimensional image slices (col. 11, line 63-col. 12, line 3. Note that the "sequence of

spatially discrete images" in col. 12, line 2 is interpreted to mean image slices. Furthermore, the "physician" viewing the images is interpreted as being the user who is located at the image workstation.) and the image workstation having an output coupled to the image server (figure 1, Note that the connection between the image server and image workstation is bi-directional).

Although Wood teaches that the image workstation sends a signal to the image server (col. 11, lines 56-63), he fails to explicitly state that the signal is representative of the three dimensional rendering. However, it would have been obvious for the image workstation to send a signal representative of the three dimensional rendering to the image server, since the image server stores all relevant patient information such as ultrasound images and patient reports (col. 12, lines 64-65). Furthermore, one would be motivated to send a signal representative of the three dimensional rendering to the image server in order to allow the most appropriate specialist who is located at a another workstation access to the file for diagnosis purposes (col. 12, lines 3-5).

Wood fails to explicitly state that the image server comprises a picture archival and communications system (PACS) server, and the image workstation comprises a PACS workstation. However, PACS servers and workstations were exceedingly well known in the art. For example, Alvarez teaches a PACS server and workstation [col. 6, lines 22-29. It is noted that Alvarez's system (10) is interpreted as being analogous to a PACS server because his system "interacts" with a PACS by sending 2D images to the PACS, in order for a physician to view the image on a workstation. Furthermore, the physician viewing the image would inherently use a PACS workstation in order to view the image received by the PACS].

Wood and Alvarez are both concerned with the management (viewing, archiving, communicating) of ultrasound images, and provide a system that includes image servers and workstations for constructing three-dimensional renderings for diagnostic purposes. Wood's server is connected to access ultrasonic images and reports, and makes them accessible to a personal computer, terminal or workstation at a remote location (Wood, col. 3, lines 20-24). Alvarez's PACS system increases flexibility by allowing older systems to access the images on the image server (Alvarez, col. 6, lines 22-29). The ordinary artisan would have been motivated to combine the teachings of Wood and Alvarez in order to provide a system that can interact with a plurality of medical imaging workstations, thereby increasing the efficiency and flexibility of the diagnosis process. Therefore, it would have been obvious to combine the teachings of Wood and Alvarez so that the two dimensional images are stored on a PACS server, and are communicated to a PACS workstation, and 3D rendering is performed on the PACS workstation.

Wood and Alvarez both fail to teach that the image slices are in the DICOM3 format. However, the applicant's specification (page 5, lines 7-8) states that other image file formats are equally applicable. In this case, Wood teaches that the image slices are in JPEG format. Wood explains that the JPEG format was commonly used for improving the transmission time of patient images (Wood, col. 10, lines 5-7). Therefore, it would have been obvious to utilize the JPEG format for the image slices, in order to transmit the patient images in a quick and efficient manner, thereby improving the diagnosis process.

Wood and Alvarez both fail to teach that the three dimensional renderings are constructed by maximum intensity pixel projection. The Examiner notes that maximum intensity pixel projection was exceedingly well known in the art. For example, Hossack teaches a PACS

system for constructing three dimensional renderings by utilizing the maximum intensity pixel projection technique (col. 19, lines 46-49 and col. 41, lines 57-61). Hossack also teaches that the image slices are in the DICOM format (col. 9, lines 21-24).

Wood, Alvarez, and Hossack are all concerned with the management of ultrasound images for constructing three dimensional renderings. Hossack provides a versatile method for processing ultrasound data that reduces speckles in three dimensional images (Hossack, col. 2, lines 30-36). Therefore, it would have been obvious to modify the three dimensional renderings of Wood and Alvarez, so that the renderings are constructed by utilizing the maximum intensity pixel projection technique as taught by Hossack, in order to improve the diagnosis process by providing the doctor with an accurate three dimensional image of the patient under examination.

Referring to claim 2, Alvarez further discloses that the PACS server stores a three dimensional rendering signal as a three dimensional rendering file (col. 5, lines 41-48. Note that the "viewing parameters" in line 41 is interpreted as being analogous to the three dimensional rendering signal, and the "bookmark" in lines 42-43 is interpreted to mean the three dimensional rendering file).

Referring to claim 3, Alvarez further discloses that the three dimensional rendering file may be selectively communicated to a physician using a PACS workstation (col. 6, lines 24-29).

Referring to claim 6, Wood further discloses that the imaging device (12) is a medical (ultrasound) imaging device (col. 2, lines 63-67).

Referring to claim 7, Alvarez further discloses that the PACS server includes a three dimensional rendering file storage (col. 5, lines 41-42 and figure 1. As noted above, the "bookmark" is interpreted to mean the three dimensional rendering file).

Referring to claim 11, Hossack further discloses that the three dimensional rendering is performed by volume rendering (col. 19, lines 46-47).

Referring to claim 12, Alvarez further discloses a three dimensional rendering by surface rendering (col. 5, lines 21-23).

Referring to claim 13, Alvarez further discloses a three dimensional rendering file (bookmark) as disclosed above, that includes the parameters needed to reconstruct the three dimensional image rendering (col. 5, lines 21-25).

Referring to claim 14 see the rejection of at least claim 1 above. Wood discloses a method of producing a rendering of a three dimensional object from a plurality of two dimensional image information files, comprising:

a. receiving by an image manager (10), a plurality of two dimensional image information files from an imaging device (12) (col. 2, line 63-col. 3, line 9)

b. storing a plurality of two dimensional image files on the image manager (col. 3, lines 3-6)

c. communicating selected two dimensional image information files to an image workstation (100) (col. 3, lines 17-24 and figure 1)

d. receiving a two dimensional image information file by the image workstation (col. 3, lines 17-24).

Although Wood teaches that a three dimensional presentation is displayed at an image workstation (col. 11, line 63-col. 12, line3), he fails to explicitly state that a three dimensional image file is constructed. However, Wood teaches that the image workstation is a computer with a monitor (col. 3, lines 30-33 and figure 1). Therefore, since it was well known for computers to

construct an image file before displaying an image (presentation) on a monitor, it would have been obvious to construct a three dimensional image file during the display of the three dimensional presentation at the image workstation.

Wood fails to explicitly disclose communicating the three dimensional image information files to the image server. However, as disclosed above, it would have been obvious to communicate the three dimensional image information file to the image server, since the image server can send or receive image information from the image workstation (col. 11, lines 59-61), and stores all relevant patient information such as ultrasound images and patient reports (col. 12, lines 64-65). Furthermore, one would be motivated to send the three dimensional image information files to the image server in order to allow the most appropriate specialist who is located at another workstation access to the file for diagnosis purposes (col. 12, lines 3-5).

Wood fails to explicitly state that the image server comprises a picture archival and communications system (PACS) server, and the image workstation comprises a PACS workstation. However, PACS servers and workstations were exceedingly well known in the art. For example, Alvarez teaches a PACS server and workstation [col. 6, lines 22-29. It is noted that Alvarez's system (10) is interpreted as being analogous to a PACS server because his system "interacts" with a PACS by sending 2D images to the PACS, in order for a physician to view the image on a workstation. Furthermore, the physician viewing the image would inherently use a PACS workstation in order to view the image received by the PACS].

Wood and Alvarez are both concerned with the management (viewing, archiving, communicating) of ultrasound images, and provide a system that includes image servers and workstations for constructing three-dimensional renderings for diagnostic purposes. Wood's

server is connected to access ultrasonic images and reports, and makes them accessible to a personal computer, terminal or workstation at a remote location (Wood, col. 3, lines 20-24). Alvarez's PACS system increases flexibility by allowing older systems to access the images on the image server (Alvarez, col. 6, lines 22-29). The ordinary artisan would have been motivated to combine the teachings of Wood and Alvarez in order to provide a system that can interact with a plurality of medical imaging workstations, thereby increasing efficiency and flexibility. Therefore, it would have been obvious to combine the teachings of Wood and Alvarez so that the two dimensional images are stored on a PACS server, and are communicated to a PACS workstation, and 3D rendering is performed on the PACS workstation.

Referring to claim 17, see the rejection of at least claim 1 above.

Referring to claim 18, see the rejection of at least claim 6 above.

Referring to claim 19, Wood further discloses that the communicating step is carried out over an Ethernet connection (col. 11, line 17).

Referring to claim 20, see the rejection of at least claim 2 above.

Referring to claim 21, see the rejection of at least claim 3 above.

Referring to claim 22, see the rejection of at least claim 13 above.

4. Claims 23, 26-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Wood (U.S. Patent No. 5,715,823) and Alvarez (U.S. Patent No. 6,370,413).

Referring to claim 23, see the discussion of at least claims 1 and 2 above. Wood discloses:

a. a medical scanner (12) (col. 2, line 62-col. 3, line 6)

b. an image server (10) coupled to the medical scanner and configured to receive and store signals representative of two dimensional image slices from the medical scanner (col. 3, lines 3-29)

c. an image workstation (100) configured to receive selected signals representative of two dimensional image slices (col. 3, lines 20-24) and configured to construct a three dimensional rendering file from the signals representative of the two dimensional image slices (col. 11, line 63-col. 12, line 3. Note that the "sequence of spatially discrete images" in col. 12, line 2 is interpreted to mean the two dimensional image slices. Furthermore, the "physician" viewing the images is interpreted as being the user who is located at the image workstation).

Although Wood teaches that the image workstation sends a signal to the image server (col. 11, lines 56-63), he fails to explicitly state that the signal is representative of the three dimensional rendering file. However, it would have been obvious for the image workstation to send a three dimensional rendering file to the image server, since the image server stores all relevant patient information such as ultrasound images and patient reports (col. 12, lines 64-65). Furthermore, one would be motivated to send a signal representative of the three dimensional rendering to the image server in order to allow the most appropriate specialist who is located at a another workstation access to the file for diagnosis purposes (col. 12, lines 3-5).

Wood fails to explicitly state that the image server comprises a picture archival and communications system (PACS) server, and the image workstation comprises a PACS workstation. However, PACS servers and workstations were exceedingly well known in the art. For example, Alvarez teaches a PACS server and workstation [col. 6, lines 22-29. It is noted that Alvarez's system (10) is interpreted as being analogous to a PACS server because his system

"interacts" with a PACS by sending 2D images to the PACS, in order for a physician to view the image on a workstation. Furthermore, the physician viewing the image would inherently use a PACS workstation in order to view the image received by the PACS].

Wood and Alvarez are both concerned with the management (viewing, archiving, communicating) of ultrasound images, and provide a system that includes image servers and workstations for constructing three-dimensional renderings for diagnostic purposes. Wood's server is connected to access ultrasonic images and reports, and makes them accessible to a personal computer, terminal or workstation at a remote location (Wood, col. 3, lines 20-24). Alvarez's PACS system increases flexibility by allowing older systems to access the images on the image server (Alvarez, col. 6, lines 22-29). The ordinary artisan would have been motivated to combine the teachings of Wood and Alvarez in order to provide a system that can interact with a plurality of medical imaging workstations, thereby increasing the efficiency and flexibility of the diagnosis process. Therefore, it would have been obvious to combine the teachings of Wood and Alvarez so that the two dimensional images are stored on a PACS server, and are communicated to a PACS workstation, and 3D rendering is performed on the PACS workstation.

Referring to claim 26, see the discussion of at least claim 6 above.

Referring to claims 27 and 28, Alvarez further discloses that the imaging system can be based on MRI or CT modalities (col. 7, lines 63-65).

Referring to claim 29, Wood further discloses that the image workstation includes a display (element 108 in figure 1).

Referring to claim 30, see the discussion of at least claim 29 above.

Referring to claim 31, see the discussion of at least claim 3 above.

Referring to claim 32, see the discussion of at least claim 13 above.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 703-306-4038. The examiner can normally be reached on Mon thru Thurs 8:30am to 6pm and alternating Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

ck
November 7, 2003

Jon Chang
Primary Examiner